SIEMENS

MAMMOMAT 3000

SP

Service

Replacement of parts

Exchange and calibration of the Compression unit

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Calibration after an exchange (replacement)

General Remarks

The mechanical work not described here includes the removal of the swivel arm covers, the disconnection of the connectors X 872, X 873 and X874, and the removal of the bolts holding the compression unit in its place (there are three such bolts in MAMMOMAT 3000/ 3000 Nova, but in MAMMOMAT 1000 there are four of those bolts holding it). This work can be done basically without an additional written instruction.

It is important, however, that the newly installed compression unit be fixed within the possibilities given by the tolerances of the holes in such a manner that the front edge of the compression plates is parallel with the breast-wall edge (thoracic edge) of the object table.

At the same time one should comply with the adjustment procedure as is described in the corresponding Chapter 3 of the currently valid instructions
"Replacement of parts - Compression plates", Print no: **SPB7-230.841.01**. The adhesive gauge block mentioned there has the material number 6483775.

NOTE

When positioning the exchange (replacement) compression unit to its place, especially at the MAMMOMAT 3000/3000Nova, make sure that the two little isolating shrunk-on hoses fixed on the backside of the electromotor do not get entangled in the upper part of the arc (or dome, also called "church"). The electromotor has to move freely under that arc. Several checks moving it by hand are necessary! See attached pictures.

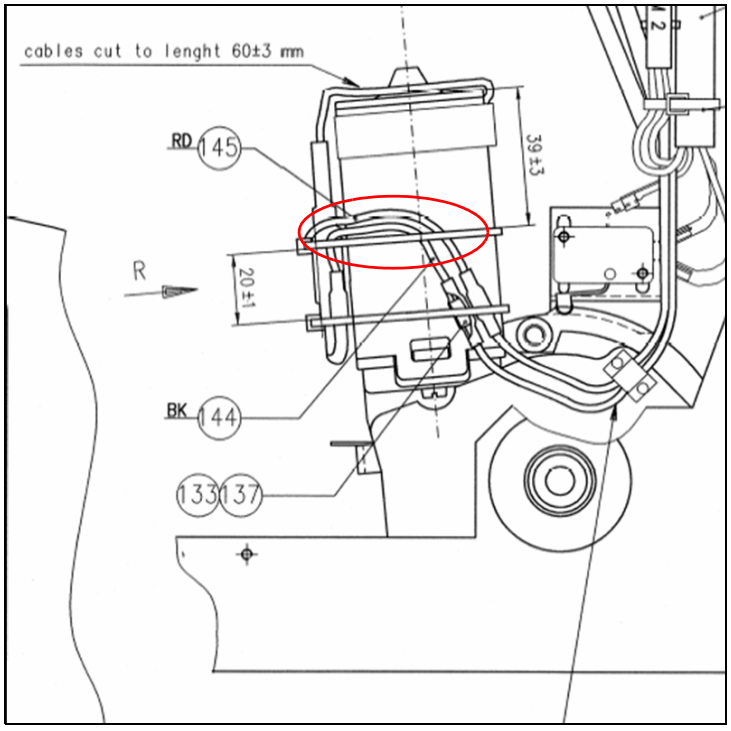

Fig. 1 Cable laying around the CU

Compression Unit (CU) - Mounting

Make sure, that the shown cables are correctly fixed close to the cable tie (see drawing above).
If not, a collision between the CU motor and the "church"/arc (it is the black curved part of the Mammo-unit) will occur. **Any, even the slightest, obstacle to the movement of the motor may cause false readings of the compression force ! The motor should move absolutely freely under the arc.**

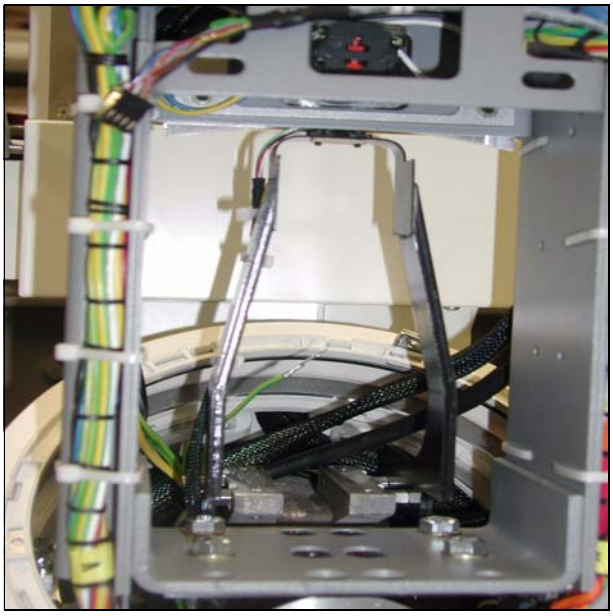

Fig. 2 "Church", arc and the bolts - fastening the CU;

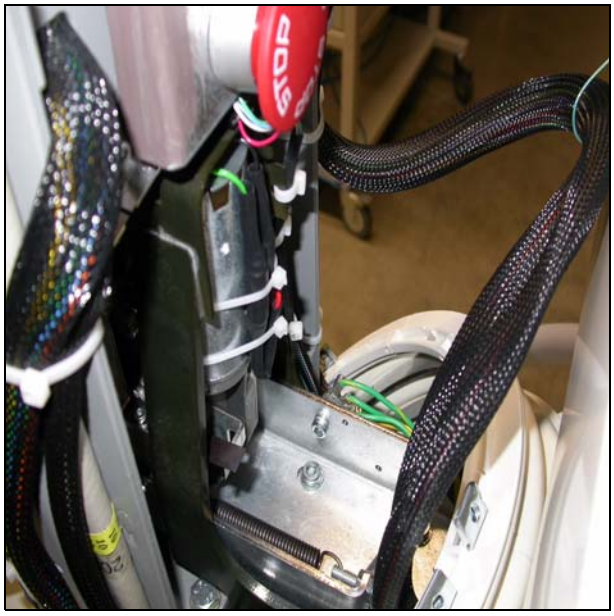

Fig. 3 Compression unit under the arc

NOTE

A full-scale calibration of the compression has to be performed whenever the compression unit itself is exchanged / replaced. This document attempts to describe such a full-scale calibration of the compression on the MAMMOMAT 1000/3000/3000 Nova. The procedure should be used also in cases when (major) repairs of the compression unit have been made.

Calibration of the compression unit

The calibration of the compression unit is performed with the help of the service software. The application of the service software on Mammomat 1000/3000/3000 Nova by means of a service personal computer (PC) is described e.g. in the document "Service Program from Service software 4.0", doc. print number **SPB7-230.114.03**.

1. The above mentioned document actually deals only with some aspects of the compression. The sub-chapter pertaining to this is "Compression" in Chapter 2, "Adjustment and Service Programs". The description in this section was meant mainly as guide on **how to check** the calibration (data) if the initial, the original calibration was already performed and correct data are stored.
2. The present document attempts to describe an initial, original calibration. In this regard, it deals with cases in which a MAMMOMAT system is equipped with a newly mounted compression unit, and therefore has either the relevant data stored from another (e.g. formerly mounted) compression unit, or has no meaningful compression calibration data stored at all.

These two documents complement each other and should be used correspondingly.

Work steps

Calibration of the compression unit

Initial check and setting

In the **Main menu**, under **Configuration > Compression**, select **Optimized compression**. If, by chance, you find the number / the value: 5137 in any of the (two) OPCOMP data fields shown in the mask that appears, change it to some other, arbitrary number. When the value in those data fields differs from 5137, press **F2** (Save).

Drive the swivel arm into the upright position, i.e. the angle of its axis to the vertical equals zero degree (0°) and the tube assembly is up. This will be the position in which all following calibration steps will be performed.

Select **Calibration** in the **Main menu**, under **Configuration > Compression**.

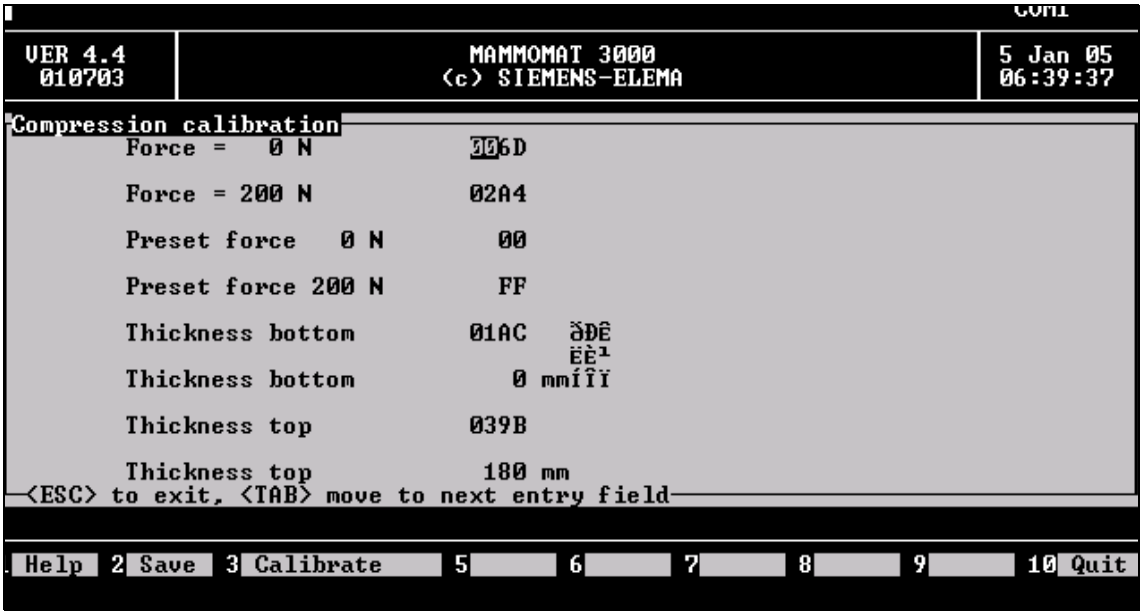

Fig. 4 Compression calibration menu

Calibration of the "Preset force 0 N"

Position the cursor in the data field of the row **"Preset force 0 N"** with the help of the tabulator, i.e. "TAB key" on the keyboard. Turn the potentiometer **F max** for "Preset force" on the front top of the compression unit counter-clockwise as far as possible (until its mechanical stop).

Press **F3** (Calibrate), then press **F4** (Update). At this point the unit should have stored the sampled value (in hexadecimals), corresponding to the minimum possible preset force of 0 (zero) newton.

Calibration of the "Preset force 200 N" (corresponds to 20 kp)

Position the cursor into the data field of the row **"Preset force 200 N"** with the help of the "TAB key" on the keyboard. Turn the potentiometer **F max** for "Preset force" on the front top of the compression unit clockwise as much as possible (until its other mechanical stop).

Press **F3** (Calibrate), then press **F4** (Update). Now the unit should have stored the sampled value (in hexadecimals), corresponding to the maximum possible preset force of 200 Newton, i.e. 20 kilopond.

NOTE	**The potentiometer F max for "Preset force" should stay at maximum throughout the whole calibration.**

Calibration of the "Thickness bottom"

When the calibration of the "Thickness bottom" is performed, no compression plate should be attached to the compression unit. Mount the object table (18 x 24) onto the table base. Drive the sled of the compression unit to its lowest position by means of the foot switch.

Move the cursor to the data field for "Thickness bottom". The actual position of the two-digit cursor in the four-digit data field is of no importance.

Press **F3** (Calibrate), then press F4 (Update).

Calibration of the "Thickness bottom mm"

Move the cursor to the data field for "Thickness bottom mm".

From the PC-keyboard enter the value 0 (zero) into the data field.

Calibration of the "Thickness top"

Move the cursor to the data field for "Thickness top". The actual position of the two-digit cursor in the four-digit data field is of no importance.

Drive the sled of the compression unit to its highest position by means of the foot switch.

Press **F3** (Calibrate), then press **F4** (Update).

Calibration of the "Thickness top mm"

Attach a compression plate to the compression unit. Do not use the compression plate with the "Flex" paddle for this work step. Use the compression plate with a regular paddle (recommended size: 18 x 24cm). Exactly this compression plate has to be used for the final check of the compression after all the calibration steps have been performed.
The object table (e.g. of the 18 x 24 cm size) has to be mounted on the base plate.

Position the cursor to the data field for "Thickness top mm".

Move the vertical sled of the compression unit to its highest position by means of the foot switch. Use the manual operation by the hand-wheel when the movement stops, so that the sled surely reaches its upper mechanical limit position.

Measure the distance from the top of the carbon fibre cover of the object table to the bottom of the paddle of the compression plate, e.g. with a tape measure. Enter the data measured in millimeters (mm) into the corresponding data field.

Calibration of the "Force = 0 N"

NOTE

The sled is still in its highest position. The regular compression plate 18 x 24 cm - used for the previous calibration step - is still attached to the compression unit. These are the correct prerequisites for the next calibration step. In order to eliminate the tolerances of the gear within the compression unit it is important to drive the sled downwards approximately five cm by means of the footswitch. Do not use the hand-wheel in this step ! Considering the above perform as follows:

Position the cursor into the data field of the row **"Force = 0 N"** with the help of the "TAB key" on the keyboard. The actual position of the two-digit cursor in the four-digit data field is of no importance.

By activating the foot-switch move the compression plate downwards **approximately 5 cm**.

Press **F3** (Calibrate), then press **F4** (Update).

Calibration of the "Force = 200 N" (corresponds to 20 kilopond)

Move the compression plate to its highest position.

The compression plate used in previous step remains attached to the compression unit.

Position the cursor into the data field of the row **"Force = 200 N"** with the help of the "TAB key" on the keyboard. The data field should contain the **default** hexadecimal value **"02D8"**. Crosscheck first, correct from the PC-keyboard, if different.

Place a suitable dynamometer, e.g. a very good quality bathroom scales with a digital display (having a measuring tolerance possibly lower than 100 pond or gram) onto the object table. Protect both the carbon fibre cover of the object table and the plexi of the compression paddle against damage by the scales used with a cloth or towel.

Activate the downward movement of the compression plate with the foot switch. Never use the hand-wheel during this measurement ! The paddle will move and reach the scales. Keep the foot-switch pressed steadily; the paddle will compress the scales. Release the foot switch only when the compression force - i.e. its value displayed on the scales - apparently doesn't change anymore. Wait approximately 10 to 15 seconds in order to allow the setup to stabilize before reading the value measured.

Repeat the measurement once/twice if the scales show a value exceeding the prescribed tolerance **± 3 N** of the **nominal 200 N** (i.e. 20 kp ± 0.3 kp). To do this, decompress first by about 50 N activating the other foot-switch and then compress again.

If the (average) force shown on the scales doesn't fall into the given range, the hexadecimal value for "Force = 200 N" - stored in the data field - has to be adjusted.

(Here is an approximation, meant only as an example; > please, observe the actual behaviour ! < decreasing the default value "02D8" by four units (to: 02D4) will result in a decrease of the force by approximately 2 N. A corresponding increase (to: 02DC) will result in an increase of the by approximately 2 N.)

Adjust the hexadecimal value and save the same by pressing **F2**.

Having the adjusted value saved (under **Calibration**) crosscheck the force as described above. Perform another iterative step by means of an additional adjustment of the hexadecimal value, if necessary. Crosscheck again.

Save the final value by pressing **F2**. You will leave the menu, (otherwise press **ESC**).

Optimized Compression

Select **Optimized compression** in the **Main menu**, under **Configuration > Compression**.

Enter the value "5137" back into both OPCOMP data fields, i.e. for OPCOMP 18 x 24 and for OPCOMP 24 x 30.

Save the entered value by pressing **F2**.

Leave the menu by pressing **ESC**.

Check of the compression unit

Maximal compression - Lowest position of the paddle

Attach the same compression plate which was in use for the Work step: **Calibration of the "Thickness top mm"** to the compression unit.

Attach the object table 18 x 24 cm to the base plate.

By activating the foot switch move the compression plate carefully downward.

NOTE	**Watch and stop the movement just before the compression plate would touch and/or press the carbon fibre cover of the object table. The downward movement has to be stopped in order to prevent damage to the paddle or to the cover. There shouldn't be more than 20 N shown on the display of compressing force.**

Check, whether the bottom of the paddle arrived and reached the surface of the object table cover.

In case of Mammomat 3000Nova, the downward movement, i.e. the compression, shouldn't stop before that point automatically, i.e. there shouldn't be any noticeable gap between these two surfaces. An easy check of this can be performed by attempting to insert a sheet of paper between them. In case of Mammomat 1000, however, the down-

ward move can stop automatically at an earlier point, a maximum gap of 0,4 mm is allowed.

Lower Endpoint

First detach and remove the compression plate from the unit.

Attempt to activate the further downward motion by the foot switch. Keep switch pressed until the sled reaches its lowest limit position (mechanical stop).

Read and record the data of compression thickness (in mm) for lower endpoint, as shown on the stand display.

Upper Endpoint

Drive the compression upward to its upper endpoint.

Attach the compression plate back again and measure the distance from the top of the carbon fibre cover of the object table to the bottom of the paddle of the compression plate, e.g. using a tape measure. (Proceed similarly as at the calibration of "Thickness top mm".)

Read and record the corresponding data shown on the stand display. Compare with data just measured.

Remove the compression plate.

Concluding steps

The replacement of the compression unit should be followed by a check.

Proceed according to Installation and Start-Up Instruction, Chapter: "Checking the compression device and OPCOMP", (which is - e.g. - the Chapter 17 in the "Installation and Start-Up Instruction - from serial No: 9000"; Print No.: SPB7-230.033.11.05).

When ready, reattach all covers, perform a test exposure and hand over the system to the customer.

Changes to previous revision 2 - 1

not applicable - new issue

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